Some Suggested Problems In Chapter 1 and the Beginning of Chapter 2

Chapter 1

1.2 So that you can compare your answers with others, use the following intervals (categories, classes): 500.5 – 650.5, ..., 3050.5 – 3200.5
Begin by completing the table below. (Some intervals contain no observations.)

Class	Boundaries	Frequency	Relative Frequency
1	500.5-650.5	1	0.02
2		1	0.02
3		3	0.06

1.5 Additional part (d): How many students in interval 1.85 – 2.45?

1.7 Use the Empirical Rule throughout. Answer to (c): 81.5% approximately

1.9 Clue for (a): If $n = 5$, then the summation becomes $c + c + c + c + c = 5c$.

1.10 The computation for the variance can be done easily with just pencil and paper: 1.467.
If you have a calculator that has a STAT mode, or a key labeled DATA or Σ+, then you can probably find standard deviations automatically; consult the calculator's user manual. The formula for the variance in 9(c) is programmed into such calculators, using one memory each to accumulate the values of n, Σx_i and Σx_i^2.
As a demonstration, here is R-code. Figure out what each function does.

```
> x <- c(1,4,2,1,3,3)
> mean(x)
[1] 2.333333
> var(x)
[1] 1.466667
> sqrt(var(x))
[1] 1.211060
> sqrt((sum(x^2) - (1/length(x))*sum(x)^2)/(length(x)-1))
[1] 1.211060
```

1.11 Partial answer to (a): $\Sigma y_i = 62{,}622$, $\Sigma y_i^2 = 86{,}027{,}202$ (also see back of book)
Partial answer to (b): Frequencies are 45, 48, 49, respectively (also see back of book)
Additional part (c): Repeat everything, omitting the two largest observations (which greatly inflate s).
For (a), try R: Similar code to above. Begin with `x <- c(964, 3168, ..., 1385)`. Of course, you'll have to fill in the 47 values at `...` . For (c) erase two of the 50 elements.

Beginning of Chapter 2

2.1 Partial answer: $A = \{FF\}$, $C \cap B^c = \{FM, MF\}$

2.5 Partial answer: $A = \{M_1M_2, M_1M_3, M_2M_3\}$, $B^c = A$, $A \cap B^c = A$.

2.11, 2.13, 2.15 (Answers in back of book.)
For 2.15, here are two **highly recommended** ways of working such a problem:
First, make a Venn diagram. Inside the region for the sample space S, you should have four regions corresponding to $A \cap B$, $A^c \cap B$, $A \cap B^c$, and $A^c \cap B^c = (A \cup B)^c$, where A = {Shaft defect}, B = {Bushing defect}, and ^{c} stands for complementation (written with an overbar in the text). Label each region with its proportion. How do these regions correspond to parts (a)–(d)?
Second, make a 2-by-2 table such as shown in Exercise 2.12. Use row headings: Shaft defect, Yes and NO; column headings: Bushing defect, Yes and No. Enter proportions into the four "cells" of the table. How do the proportions in the cells correspond to proportions in the Venn diagram; how do they correspond to answers for parts (a)–(d)?
Additional question for 2.15: Restrict attention to consider *only* assemblies with bushing defects: What proportion of these also have shaft defects? Answer: 1/4. How obtained? Comment.